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MEDICINE

Fatal Burn Infections

World-wide progress in burn research has been made by physicians and biologists, Faye Marley reports from the First International Congress on Research in Burns.

➤ A GRAM-NEGATIVE species of bacteria called pseudomonas is outstripping staphylococcus as a cause of fatal infection in burn patients.

Lieut. Col. Wilfred T. Tumbusch, Brooke Army Medical Center, Fort Sam Houston, Texas, told the First International Congress on Research in Burns in Bethesda, Md., that pseudomonas organisms have become a major threat, whereas staphylococcus organisms have been declining in importance.

Col. Tumbusch said pseudomonas infections appear to be invariably fatal to burned patients.

In a study of 596 burn patients treated at Brooke between 1954 and 1959, Col. Tumbusch said that 77 died of infection. He said either *Staphylococcus aureus* (golden staph) or *Pseudomonas aeruginosa* (an organism that produces blue pus) or both were found in the wounds of 66 of these patients.

Although there were 17 survivors of severe burns with septicemia (blood poisoning) in the five-year period, there were no survivors of pseudomonas septicemia. Death occurred in spite of prompt therapy with Polymixin B and colistin sulfate, the most effective antibiotics known against the pseudomonas organism.

Col. Tumbusch said pseudomonas organisms have been found increasingly in burn surfaces since 1954, and since 1956 have been the most common organisms in burn wound cultures.

He said the cause of the increase is not known. He suggested that the increase of pseudomonas septicemia and the fall of staph invasions "may represent normal cycles of propagation of the species, and a return to the previous ratios may be forthcoming.

"If the trend, however, is real, invasion by *Staphylococcus aureus*, which has been 74% fatal, is being replaced by pseudomonas invasion, which has been lethal in all patients," he said.

Col. Tumbusch believes that in a fatal burn case, in which the patient has an infection, the infection is the cause of death. He said hope for improvement in this situation lies in the control of the effects of gram-negative bacteria infection.

• Science News Letter, 78:211 October 1, 1960

WHALE'S BONES—The fossil bones shown by Franklin Pearce, chief preparator of the Smithsonian vertebrate paleontology laboratory, are those of a whalebone whale estimated to be from 17,000,000 to 20,000,000 years old. Found near Hampton, Va., not far from Norfolk, the whale has been brought to the Smithsonian to be compared with other fossil whale specimens. The whale's shoulder blade, upper arm and forearm are on the table while parts of its skull is on the wagon.

May Cause Burn Shock

➤ THE DANGEROUS PERIOD of burn shock during the first 24 to 48 hours following a severe burn may be caused by injury to the heart muscle. Shock is a principal cause of death following burns.

Dr. Henry A. Fozzard of the Washington University School of Medicine in St. Louis, Mo., reported laboratory experiments indicating this possibility to the First International Congress on Research in Burns at Bethesda, Md.

Describing his experiments on 38 mongrel dogs, Dr. Fozzard observed that cardiac output invariably falls precipitously following a severe burn. An explanation of the fall may be primary myocardial (heart muscle) injury, he said.

Dr. Fozzard followed up the hypothesis with treatment, believing that if injury to the heart muscle does occur, drugs such as digitalis would increase the force of the heart contraction. He tested various treatments experimentally.

The dogs were separated into small groups. One group was treated with digoxin (a type of digitalis). Another group was treated by administration of intravenous fluids, while a third was treated both with fluids and digoxin. The experimenters got best results when both fluids and digoxin were given immediately after the burn.

Dr. Fozzard said that collection of fluid in the lungs may be prevented by the use of digitalis for burn patients.

• Science News Letter, 78:211 October 1, 1960

Dresses Can Be Deadly

➤ WEARING NIGHTGOWNS can be deadly—in case of fire. Dr. A. B. Wallace, Edinburgh, Scotland, surgeon in charge, department of plastic surgery, Royal Hospital for Sick Children, told the First International Congress on Research in Burns, children wearing pajamas less than one-tenth as often as they happen to those wearing gowns.

Dr. Carl A. Moyer, Washington University School of Medicine, St. Louis, Mo., reported that five girl children for every boy child is burned in the American Southwest because the boys wear overalls and the girls wear dresses.

"In England," Dr. Patrick W. Clarkson, surgeon in charge, Casualty Department and Children's Burn Unit, Guy's Hospital, London, said, "the British Independent Television Association cooperated with our request that children not be shown in flammable nightdress before an open fire."

International education is recommended by the Burn Congress to reduce the high number of casualties from burns all over the world. Open heaters are among the most dangerous causes of burn accidents.

• Science News Letter, 78:211 October 1, 1960

GENETICS

Find Extra Chromosome

➤ AN EXTRA CHROMOSOME in a mentally retarded 21-year-old woman with minor congenital abnormalities has been reported by researchers at the Roswell Park Memorial Institute, Buffalo, N. Y.

The first description of the finding of an extra chromosome among the six largest chromosomes is given by Dr. Avery A. Sandberg, Lois H. Crosswhite, and Dr. Edwin Gordy in the Journal of the American Medical Association, 174:221, 1960. Chromosomes, located in the nucleus of the cell, contain genes which determine hereditary traits.

Each normal human being has 46 chromosomes—22 pairs of autosomes and two sex chromosomes. Half of the chromosomes come from the mother and half from the father at the time of conception.

There have been previous reports of an extra chromosome among the smallest chromosomes in persons with mongolism, a specific type of mental retardation, and of an extra chromosome of medium size in children with congenital defects.

"From the present findings it follows that trisomy (an extra autosome) is associated with various congenital defects . . . depending on the chromosomes involved and the resulting impact on over-all genic balance (the distribution of genes)," the researchers said.

It had previously been surmised, the authors said, that on the basis of gene content, the larger the extra chromosome, the more lethal and complicated the associated abnormalities would be.

However, they said, "the finding in our case would seem to indicate that there may not be any significant correlation between the size of the chromosome involved in trisomy and the extent and number of congenital abnormalities."

They added the trisomy in itself may not always result in obvious congenital defects since a case has been reported of an apparently normal father with 47 chromosomes who had a mongoloid child.

In the case reported, the main physical defects include webbing of the skin around the neck and flatness of the back of the head. The young woman's I.Q. was about 40, but she possessed a good memory for certain events and for numbers.

The extension of chromosomal studies in patients with mental retardation and other congenital defects should aid in establishing genetic distinctions within groups of superficially similar syndromes.

• Science News Letter, 78:212 October 1, 1960

MEDICINE

Female Pills Safe for Men

➤ SMALL TO MODERATE DOSES of estrogens (female hormones) can be given to men who have had heart attacks without making them effeminate or causing other undesirable effects.

Reporting in the Journal of the American Medical Association, 174:241, 1960, four Los Angeles doctors say that long-term therapeutic use of female hormones for men has been found to be "entirely feasible."

This conclusion is reported by Drs. Jessie Marmorston, Oscar Magdison, Oliver Kuzma and Frederick J. Moore. They base their findings on a study of 109 men, ranging from 35 to 83 years of age, who were treated with estrogens for a total of more than 900 months.

All the patients had suffered heart attacks (myocardial infarctions) as a result of hardening of the coronary arteries surrounding the heart. A high content of fats in the blood may be involved in the development of hardening of the arteries, so the female hormones were administered to reduce the blood fat levels.

The ability of estrogens to reduce fats in the blood is well known but their use for men has been limited because they have been known to cause feminization.

The authors say their findings indicate clearly that the long-term investigative administration of small to moderate doses of estrogen to men with myocardial infarction is warranted.

Each patient was started on a small dose that was increased little by little over a considerable period of time.

There was pain or tenderness of the breast as an early manifestation in every case, the researchers said. But of 44 patients available for observation for some months after this symptom appeared, 15 tolerated the same dosage thereafter and 17 tolerated an even greater dosage. In only 12 was it necessary to reduce the dosage, they said.

With this gradual approach to tolerance, the physicians said, clinical side-effects have presented no obstacle to continuation of the treatment.

• Science News Letter, 78:212 October 1, 1960

PUBLIC HEALTH

Fall's Dreaded Weed Victimizes One in 15

See Front Cover

➤ THE MALE, pollen producing flower of the ragweed, seen on the cover of this week's SCIENCE NEWS LETTER, is the culprit that victimizes one out of every 15 persons in the Eastern and central United States.

The staminate flowers, projecting from the "cups," drop hundreds of pollen grains onto the leaves of the ragweed and other nearby plants.

Here the pollen sticks until the wind carries it away and scatters it in the air as a potential source of autumnal catarrh or hayfever, Dr. Warren H. Wagner, Jr., reports from the Cranbrook Institute of Science, Bloomfield Hills, Mich.

The major part of the atmospheric pollen load in August, September and October comes from ragweeds.

Dr. James A. McLean, allergist at the Univeristy of Michigan Medical Center, has warned that hay fever can lead to asthma for about a third of today's suffers if they relieve only the symptoms and do not attack the causes. He said antihistamines and trips to low-pollen areas do not prevent a hay fever victim's progression into an asthma victim. However, this may be stopped by injections of the substance the patient is allergic to, Dr. McLean said.

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LINGUISTICS

Automatic Dictionary

➤ A 600,000-WORD DICTIONARY to be used by a computer in a program of linguistic research has been developed at the University of California at Berkeley. No human hand will flip through this dictionary as the program was designed to result in the automatic translation of Russian technical literature solely by means of electronic equipment.

According to Dr. Sydney M. Lamb, lecturer in linguistics in charge of the program, the new Russian-English dictionary has the largest vocabulary in the machine translation field. The California system has as its ultimate goal the translation of 360,000 words per hour at a fraction of the cost of human translations.

The mechanical dictionary, called RUSDIC, will be used in conjunction with a program on the University's IBM 704 computer which looks up the words needed for specific translations.

Dr. Lamb explained that all dictionaries for human use have entries consisting of a heading and a definition following immediately after. But in the RUSDIC the definitions are completely separated from the headings. When the 704 looks up a word in the mechanical dictionary, a reference number associated with the heading tells the computer where to find information on the word. The location of the word in the dictionary reveals to the machine the "address" of the information about that word.

When the 704 arrives at the new address, it finds three types of information on the word in question: a code giving syntactic and semantic information on the word, rules for dealing with the word in context, and the addresses of equivalent words in English.

One of the beauties of the computer programs for look-up and dictionary arrangement, according to the linguist, is that they may be used with a similar mechanical dictionary for any language. The overall machine translation system being developed by Dr. Lamb and his associates will produce intelligible English sentences out of any language for which a mechanical dictionary exists.

The system, when completed, will be as fast as the computer with which it is used. For example, dictionary look-up operates at a rate of about 125 words per second on the 704. But on the faster IBM 7090, it would do about 500 words per second. At this rate it would take about one minute and 20 seconds to look up all the words in the average Russian technical journal.

For the complete machine translation system the 704 would do about 70,000 words per hour, assuming that a very good quality translation was desired. On the 7090, Dr. Lamb expects to translate about 360,000 words per hour, or a journal every nine minutes.

The linguist, whose work is supported by the National Science Foundation, will soon expand his project into the machine translation of Chinese technical literature.

A fully operating machine translation system, he said, still lies several years in the future. When it comes it should cost about one-eighth of a cent per word if used on the IBM 7090. A slight additional cost will also be necessary for recording the printed word on magnetic tape for use by the computer. Present costs of human translation range from one to three cents per word.

• Science News Letter, 78:213 October 1, 1960

ROCKETS AND MISSILES

Satellite System in 1963

➤ THE DEPARTMENT OF DEFENSE will have an operational communications system using a satellite or satellites by early 1963, a technical director in the Army's Office of the Chief Signal Officer, told a space electronics and telemetry symposium meeting in Washington, D. C.

Clifford D. May Jr. said the system would be improved over the experimental Courier communication satellite soon to be launched. but even this experimental model could handle the Army's bulk communications traffic at 1963's expected level—if ground stations were available to send and receive messages.

Mr. May spoke at the Institute of Radio Engineers' Fifth Symposium on Space Electronics and Telemetry.

For the 1963 system, Mr. May projected a "hypothetical system" using four ground stations in Asmara in eastern Africa, and the Philippines, Puerto Rico and Hawaii.

"As gateways they will distribute Courier messages throughout their respective areas by conventional means and act as area collection points for bulk traffic destined for another area via the satellite," he said.

Courier would send down and receive messages for about six minutes over each station.

Special, high-speed teletypewriters would be used in the stations to gather and send information at a fast clip. Thus the satellite capacity could be upwards of 6,000,000 information bits per orbit between any two ground stations.

The satellite system would be tied into Unicom (Universal Integrated Communications System) now being developed by the Army. Eventually Courier satellites, which repeat messages as they swing about the earth, would be replaced by Advent satellites.

Advents will have 24-hour orbits and thus seem to stand still above the equator. Three or four could broadcast to each other and thereby to almost any part of the world.

• Science News Letter, 78:213 October 1, 1960

DIPOLES, NOT SCRATCHES—The tiny metallic fibers, or dipoles, about a half inch long and one-third the diameter of a human hair, will be placed in orbit to relay radio messages over very long distances, in a new "orbital scatter" communication system developed by the M.I.T. Lincoln Laboratory, Lexington, Mass.

GENERAL SCIENCE

National Science Fair—International Expanding

➤ THE SCOPE of the National Science Fair—International is widening steadily with the affiliation of additional area and state fairs, cooperation from still more professional organizations and expansion of the activities of agencies already supporting this international program to encourage the development of potential scientists, engineers and technologists.

With 1960-61 science fair activities just beginning, affiliation forms have been received from seven new fairs, according to SCIENCE SERVICE which conducts the national fair as part of its science youth program. A number of other fairs here and abroad expect to complete affiliation plans in time to be part of the 12th National Science Fair-International when it is held next May in Kansas City, Mo.

The American Heart Association and the Optical Society of America will make awards at the annual event and are planning cooperation with regional and area science fairs through their local chapters.

The U. S. Army and the Association of the U. S. Army will increase the number of awards made at the national level and the support offered local and regional fairs by area commands. The U. S. Air Force also is enlarging its award program at both the national and regional levels.

New fairs whose affiliation has been completed include: Western Colorado Science Fair, Mesa, Colo.; Northeastern Indiana Tri-State Science Fair, Angola, Ind.; Rockland County Science Fair, Nyack, N. Y.; Texas District III Regional Science Fair—Southern Division, Harlingen, Texas; Wiley College Science Fair, Marshall, Texas; Vermont State Science Fair; Knights of Pythias First Fox Valley Science Fair, Appleton, Wis.

• Science News Letter, 78:213 October 1, 1960

BIOCHEMISTRY

Chemistry of Skin Cancer

➤ SKIN CANCER may be tied to a decline in body protein, according to a report to the American Chemical Society in New York.

A decrease in collagen, a protein normally found in abundance in the skin, accompanies the development of skin tumors in animals, Dr. I. Gordon Fels of the Veterans Administration Hospital, Hines, Ill., said.

The decrease in collagen was indicated chemically by the gradual disappearance of an essential chemical-building block for the protein, called hydroxyproline, he explained. This change makes it possible to trace "chemically what happens as a tumor makes its appearance and displaces the normal tissue."

In developing this technique, Dr. Fels and his co-workers painted susceptible mice with a tumor-producing agent in solvent benzene. "Control" animals were painted only with the benzene for the same period.

Tissue injury was present in both groups of animals. Hydroxyproline levels dropped in both cases, but in the control animals they returned to normal after the painting was stopped. The telltale chemical made an "abortive rise" in the tumor-affected animals and then continued to decline until the skin was devoid of collagen.

"The decrease in hydroxyproline content in the 'tumor' animals is believed to be caused by the destruction of the cellular agent responsible for the synthesis of collagen, namely the fibroblast," Dr. Fels said.

In the case of the control animals which did not receive the tumor-producing agent, the process was reversible. In the case of the tumor animals, it was not.

• Science News Letter, 78:214 October 1, 1960

BIOCHEMISTRY

Blood Links Men and Apes

➤ A COMMON ANCESTOR of man and apes is suggested by the similarity of their chemical "fingerprints," their hemoglobin (red blood pigment) patterns, Dr. Emile Zuckerkandl, a chemist from the California Institute of Technology, told the American Chemical Society in New York.

He reported the results of hemoglobin analysis done with Nobel winner Dr. Linus Pauling and Dr. R. T. Jones in studies of genetics and evolution. The hemoglobin patterns of man and 11 adult animals of different kinds were analyzed, including the gorilla, chimpanzee, orangutan, cow, pig, sheepshead fish, shark, lungfish, hagfish, and a marine worm. These represent a very wide spread on the evolutionary scale, he noted.

"The fingerprint technique shows that man's hemoglobin is almost indistinguishable from that of the gorilla and chimpanzee," Dr. Zuckerkandl said.

"The evidence suggests that the hemoglobin of man and the higher apes has changed very slightly since their common ancestor was alive 10,000,000 to 35,000,000 years ago."

A hemoglobin molecule consists of some 600 amino acid building blocks attached to one another in a definite sequence, "like beads in a chain," Dr. Zuckerkandl said. There are 21 different kinds of amino acids. In most animals, each molecule contains four separate chains.

"The more related two kinds of animals are on the evolutionary scale, the more alike are the sequences of the amino acids in the various chains of their hemoglobin molecules," he explained. In other words, the hemoglobin pattern reflects to some extent the evolution of the entire animal.

Spot patterns of hemoglobins on filter paper used for the study were first developed by Dr. Vernon Ingram of Massachusetts Institute of Technology and called "fingerprints" because identical hemoglobins invariably form the same pattern, the California chemist stated. They are visible with an electronic microscope only in clusters. A single molecule of hemoglobin cannot be seen even with an electron microscope.

• Science News Letter, 78:214 October 1, 1960

CHEMISTRY

Plastic Coats Fertilizers

➤ THE LATEST in garden wear—for fertilizers—are plastic coatings, Dr. Kirk Lawton, professor in soils at Michigan State University, reported to the American Chemical Society meeting in New York.

The purpose of the coating is not to minimize odor. The dressed-up fertilizers can create "lush lawns and gorgeous gardens" better than conventional uncoated fertilizers because the coating slows down the rate at which their various constituents are released to the soil, he explained.

The plastic coatings on fertilizer make it possible to meter out the nutrients more nearly as plants require them, Dr. Lawton said.

Laboratory and greenhouse experiments carried out by Dr. Lawton showed that a coated fertilizer lost only 5.4% of its potassium (an important fertilizer mineral) while the same amount of uncoated fertilizer lost 81.3% in the same period of time.

Most fertilizer used on farms and gardens and lawns in the United States is applied before or at the time a crop is planted or starts growing. The components of soluble fertilizers, therefore, are largely free to react with soil minerals. At this time, the nutrient requirements of seedlings or transplants are small.

Plastics used for coatings in the experiment included vinyl acetate, paraffin, acrylic resin and polyethylene, all of which were effective in reducing the rate at which soluble fertilizers normally dissolve in soils.

• Science News Letter, 78:214 October 1, 1960

Adapts Russian Resin

➤ IT TOOK AN AMERICAN to find a commercial use for a Russian-discovered resin that has been sitting unused on the laboratory shelf every since 1903, the American Chemical Society was told at its New York meeting.

The resin, formolite, was discovered by the Russian chemist A. M. Nastyukov. It is made from formaldehyde and an "aromatic" organic compound, Dr. J. E. Goodrich, research chemist with the California Research Corporation, Richmond, Calif., reported. It is Dr. Goodrich who found the use for the Russian resin.

By adding a dispersing agent to the resin, Dr. Goodrich has produced resins with very small particle size and large surface area. They have many potential uses as thickeners in lubricating grease, lacquers, paints, varnishes, inks, putty and adhesives.

The advantage of the American-adapted Russian resin in lubricating greases, said Dr. Goodrich, is that the high-temperature performance of the grease is not limited by the high melting point of the thickener.

Melting points of these resin-thickened greases are in excess of 500 degrees Fahrenheit, he said.

• Science News Letter, 78:214 October 1, 1960

Rubber Puts Out Fire

➤ RUBBER that can take extremes of heat and cold was reported to the American Chemical Society meeting in New York.

A new nitroso rubber is not only flameproof. It extinguishes flame. It also remains flexible and usable at 40 degrees below zero Fahrenheit, is resistant to solvents and a wide variety of strong chemicals and stands up against sunlight and ozone, Dr. J. C. Montermoso of the U. S. Quartermaster Research and Engineering Command, Natick, Mass., said.

Used to coat fire-fighting uniforms, the new material will provide greater protection for firemen. It will also give some protection against nuclear blasts which generate short-impulse, high intensity heat, Dr. Montermoso said. The molecular "backbone" of nitroso rubber is made of carbon, oxygen and nitrogen.

Direct contact with a flame causes the rubber to give off a gas that tends to extinguish the flame, Dr. Montermoso said.

(See other Chemistry story on p. 222)

• Science News Letter, 78:214 October 1, 1960

DIG BY ELECTRICITY—Dr. Matthew W. Stirling (seated), research associate of the Smithsonian Institution, operates resistivity equipment in Mexico.

ARCHAEOLOGY

Explore by Electronics

➤ AN EXPERIMENT in archaeological exploration with earth resistivity equipment, generally used by highway engineers for determining subsoil conditions, has just been completed in Mexico.

Dr. Matthew W. Stirling, research associate of the Bureau of American Ethnology of the Smithsonian Institution, Dr. Froelich Rainey, director of the University Museum, University of Pennsylvania, in Philadelphia, and Matthew W. Stirling Jr. report in Expedition, 2:19, 1960, on the work done in the region, Cerro de las Mesas, 40 miles south of the city of Veracruz.

This region contains large groups of man-made mounds. It is apparent from the sizes of the mounds and the amount of labor that went into building them that this area was one of the most densely populated and highly civilized in the New World more than a thousand years ago.

The instrument used by the archaeologists in their explorations, the Michimho, is an earth resistivity instrument manufactured by Associated Research, Inc., in Chicago. It measures the electrical conductance of the soil to a depth of about 90 feet. It is portable and weighs 25 pounds.

The Michimho is connected by four wires to four metal pins driven into the ground at equal intervals along a straight line.

An alternating current passes between the two outer pins and a voltage is thereby induced across the two inner pins giving a measure of the average electrical conductance of the soil between these two pins to a depth equal to the space between them.

If the pins are set three feet apart the average conductance of the soil is measured between the two inner pins from the surface to a depth of three feet.

The scientists first tested the instrument on some stone monuments found in 1941 that had been reburied. These were used because it was known that solid stone has practically no conductance, and this should register on the instrument.

After taking readings, both around the monuments and away from them, the scientists found that the buried stone monuments did give a lower conductance reading. However, the difference in the readings between spots close to the stone and away from the stone varied as the pins were moved closer together or farther apart.

After hundreds of measurements, the authors state there is no conclusive proof of the method. Although many objects were found, others may have been missed. However, given a large enough mass of stone and the most favorable spacing of the pins, it is certainly possible to locate such objects.

Although the purpose of the work was to test the resistivity equipment, some archaeological finds were made. Artifacts in the form of offerings were found in the trenches dug by the scientists in the mounds.

In many of the trenches, burials were found without accompanying materials as if the burials themselves were offerings. This seems to confirm the belief, suggested by earlier finds on the site, that human sacrifice was practiced by the ancient people who built the mounds.

• Science News Letter, 78:215 October 1, 1960

SOCIOLOGY

Bleeders' Long Life Span Creates Social Problem

➤ INCREASING the life span of hemophiliacs has created social problems for these victims of "bleeders' disease."

This is pointed out by Dr. Alfred H. Katz of the University of California at Los Angeles Medical School. Dr. Katz has just received a $24,357 grant from the Office of Vocational Rehabilitation for a study of these problems.

A generation or two ago the majority of hemophiliacs did not reach adulthood. But modern techniques of transfusion and use of blood derivatives have made it possible for most of them to live to adulthood and thus be faced with the necessity of earning a living.

Many young adult hemophiliacs do not have sufficient education or specialized training to give them stable occupation because of broken schooling from their illness. However, hemophiliacs can be trained to hold jobs that do not involve great physical exertion or hazards.

Dr. Katz will make a nation-wide survey of the vocational situation of hemophiliacs, the types of positions they have been able to hold, employer attitudes, special arrangements for medical care, transportation and other practical problems.

"Our aim is not only to make it possible to train more hemophiliacs for employment through state vocational rehabilitation services, but to induce employers to make more effective use of this pool of manpower," he says.

• Science News Letter, 78:215 October 1, 1960

SOCIOLOGY

Juvenile Delinquents Have Values of Adults

➤ THE VALUES that often govern the adult world may in reality be the same as those of juvenile delinquents—even though the latter may commonly be pictured as rebels against society.

Three major values seem to underlie the behavior of juvenile delinquents, says Dr. Gresham M. Sykes, a criminologist and sociologist, from Dartmouth College, currently a visiting professor at the University of California, Los Angeles.

They are: adventure, the search for kicks; exploit, a contempt for work coupled with a taste for luxury; and aggression, a forceful toughness as a symbol of manhood.

The same values have traditionally made up the code of the aristocratic leisure class, Dr. Sykes believes. As the enjoyment of leisure has spread to the rest of the population, and work has lost much of its status as a calling, the "aristocratic" values have been accepted by much of our entire society.

Adventure, exploit and aggression are not part of society's official and respectable code, but these "subterranean values," as Dr. Sykes calls them, play a large if unpublicized role in the American value system.

Most adolescents, whether wealthy or not, are members of the leisure class, freed from the earlier domination of parents but not yet working or married. Juveniles are therefore particularly apt to adopt leisure class values, although whether these values will lead to delinquency will depend to some extent on their living conditions and attitudes toward work and school.

• Science News Letter, 78:215 October 1, 1960

RADIO

Saturn Radio Waves Show It's Cold on Planet

➤ CLEAR RADIO WAVES from the planet Saturn and from a remote, gas-surrounded dying star have been measured for the first time. The University of Michigan's head of radio astronomy, Prof. Fred T. Haddock, reported the University's pioneer measurements to the 13th General Assembly of the International Scientific Radio Union in London.

The scientists used the University's 85-foot radio telescope. The data showed Saturn's atmospheric temperature is minus 283 degrees Fahrenheit. The gas-surrounded star—called planetary nebula, New Galactic Catalog 6543—is 3,000 light years away.

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HORTICULTURE

Tracers Seek Cause Of Brown Core in Pears

➤ USING RADIOACTIVE "TRACERS" that map chemical action, Oregon State College researchers are trying to determine how carbon dioxide given off by pears during storage causes the fruit core to turn brown.

Radioactive carbon isotopes may be able to trace the carbon dioxide pattern of attack in the fruit. So-called brown core in pears has become a problem in recent years with the widespread use of sealed plastic bags for storing pears through the winter. The sealing slows down respiration or oxidation of the fruit and thus prolongs its life.

The big problem is that the carbon dioxide builds up in the bag. Pear packers have solved the problem, in part, by punching holes in the plastic bags to permit some escape of carbon dioxide, but this shortens storage life of pears by about one month.

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FORESTRY

Natural Root Grafts Form "Tree Society"

➤ MANY FOREST TREES join themselves together through natural root grafts, forming a "tree society" in which the members can in effect support one another, but they can also compete strongly for the available nutrient supply.

Theodore T. Kozlowski, a University of Wisconsin forester, and John H. Cooley, a U. S. Department of Agriculture research forester, found such grafts common with several Wisconsin evergreens and broad leaf trees. But the natural grafts take place only between trees of the same species, with possible rare exceptions, they said.

The natural grafts result in an actual union of the live tissues of the trees, permitting sap to pass from one tree to another, the researchers said. Roots as small as an eighth of an inch in diameter form natural grafts, and the unions usually take place where roots are growing more or less at right angles with each other.

The findings of the two men also suggest that wind sway helps to promote grafts on trees growing in soft ground or bogs.

Where trees of different species grow close together, the roots may mingle but grafting ordinarily does not take place. Even when growth pressure in the mingling root is great, a bark layer stays between the roots of the different species.

Mr. Kozlowski and Mr. Cooley said this natural root grafting brings up new questions in forest management and disease control. Diseases such as oak wilt, as well as parasitic diseases, can spread from one tree to another through the root grafts. And weed-killing chemicals applied to kill specific trees may also kill nearby trees by traveling through the joined root system. The researchers said that new disease control practices will have to be adjusted to these chain effects.

In their studies, the two foresters found natural root grafts on sugar maple, red maple, yellow birch, paper birch, balsam fir, eastern hemlock, northern white cedar, pin oak and bur oak.

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PSYCHOLOGY

Porpoise Locates Food With Built-In Sonar

➤ THE PORPOISE is remarkably good at "seeing with its ears," Dr. W. N. Kellogg of Florida State University in Tallahassee reported in Chicago to the American Psychological Association.

The porpoise has a built-in "sonar" which scores from 98% to 100% correct in locating objects, Dr. Kellogg said.

In one experiment he tested the animal's ability to distinguish between available food fish and other fishes blocked off from him by an invisible barrier of plate glass. Unerringly, the porpoise would go to, catch and eat the free fish and never try to reach the equally attractive fishes behind the glass barrier. In 202 tries not one error was made.

The porpoise sonar, Dr. Kellogg said, works on the same principle as the sonar of the Navy. The animal emits trains of sound-pulses. The echoes of the sound-pulses are later picked up by the animal after they are reflected back by the various objects in the water. The porpoise can distinguish between various fishes by the patterns of echoes reflected by the fishes.

In many ways, Dr. Kellogg said, the porpoise sonar is superior to the best that man has yet been able to devise. Navy scientists and other research scientists are studying the porpoise sonar in the hope of improving the Navy instrument.

In order to prove that the porpoise does not depend on smell or taste to find his way to the available fishes, Dr. Kellogg devised another experiment. The porpoise was required to swim through one of two doorways or openings in a submerged net of one-eighth-inch wire. One of the doorways was blocked by an invisible barrier of heavy transparent plastic. The porpoises were 98% correct in picking the open doorway.

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IN SCIEN

ICHTHYOLOGY

Prize Musky, Like Tree, Reveals Age by Its Rings

➤ A FISHERMAN can tell the age of his prize musky by counting the rings in its vertebrae, in its fin bones or on its scales, according to Leon D. Johnson, fishery research biologist for the Wisconsin Conservation Department.

The vertebrae of a cooked muskellunge are easy to separate, Mr. Johnson said. The circles on the ends of the vertebrae can be counted as year rings, much as the rings on a stump are counted to tell the age of a tree. The rings will be more evident after the bones have dried for a time, than on the fresh vertebrae.

A microscope is needed to count the rings in a cross section of the fin bones, after sawing off cross sections of the dried fins about the thickness of cardboard with a jeweler's saw. Light bands in the fin bone show the winter growth and dark bands the summer growth in the rings in the bone.

A microscope will be needed to count year rings on the scales. There is a wide summer growth and a narrow winter growth, the latter showing up as a thin line marking one annulus, or one year of growth.

Mr. Johnson warned that sometimes, if food becomes scarce during the summer, the musky may lay down a false year ring, and in very old muskies, the growth may become so slow and the rings placed so close together that it is hard to count them.

According to the U. S. Fish and Wildlife Service, the average musky (*Esox masquinongy*) is three and one-fourth feet long and weighs about 15 pounds. The biggest catch on record was over five feet long and weighed 70 pounds, four ounces.

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PSYCHIATRY

Mental Hospital Aged Increase Alarmingly

➤ THE PROPORTION of older persons in mental hospitals is increasing at "a disturbing rate," the Senate Subcommittee on Problems of the Aged and Aging reports. One out of three patients in public mental hospitals is 65 or over.

Sen. Pat McNamara (D.-Mich.), chairman of the Subcommittee, said in releasing the report, "By 1970, it is estimated there will be a 34% increase over 1959 in the number of aged patients in mental hospitals."

He asked for more investment in community mental health facilities and in research and training programs. Otherwise, present trends will burden taxpayers and bring a tragic end to thousands of the aged, the Senator said.

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E FIELDS

NUTRITION

Desert Snail's Juice Can Save Stranded Men

➤THE SPECIES of snail called Ehrenbergi Roth may rank in the future with the St. Bernard dogs as friends of travelers in distress. These snails can stave off death from thirst among survivors of aircraft crashed in a desert, tests have shown.

The large white snail is found in the Negev, the desert in southern Israel, and in the scrub desert along the north African coast. In its shell it carries up to half a teaspoonful of "water," actually its body fluids.

In times of drought, the snail can seal itself up and last as long as four years. A crashed airman can stay alive about four days in similar circumstances.

Interest in the snails began when a Royal Air Force instructor in the desert survival school in Libya trod on one and noticed it contained moisture.

The Royal Air Force at El Adem collected thousands of Ehrenbergi and sent them in sacks to Flight Lt. John Billingham of the Royal Air Force Institute of Aviation Medicine, Farnborough, England.

Lt. Billingham fed the fluid to two rats, which actually put on weight on the new diet. Analysis showed that the juice contained no dangerous parasites or microbes and no toxic substances.

The Ehrenbergi's juice contains a high quality of protein, and Lt. Billingham, putting it to the test, found that four pints of it a day were enough to sustain him. In his simulated test of a desert crash, Lt. Billingham was shut up in a chamber in which the temperature was sometimes as high as 118 degrees Fahrenheit.

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ORNITHOLOGY

Radiation Clouds Blamed For Changes in Feathers

➤ SCIENTISTS working in the department of zoology and comparative anatomy of St. Bartholomew's Hospital Medical College in London have found strong evidence that birds which have been arriving in Britain with strange plumage have had the colors of their feathers changed by flying through radioactive clouds.

The work has been carried out by Dr. Brian Lofts, aided by Dr. A. J. Marshall, head of the department, and by Prof. J. Rotblat, head of the medical college's department of physics. It was begun when a doctor and amateur ornithologist in southeast England found a strange bird in the estuary of the River Medway early last winter.

Dr. James Harrison of Sevenoaks, Kent, came across the bird, a redshank, in Milfordhope Marsh. It was identifiable by its bright orange-red legs which give it its name. But Dr. Harrison was surprised to see that the bird had its spring feathers—with chestnut tints and black streaks which are never normally seen until March or April at the earliest.

Dr. Harrison was baffled until he read a report of similar out-of-season plumage on birds in Kenya. John Williams of Nairobi had found several birds with the "wrong" feathers. The birds discovered in East Africa were found to have come from Russia. Mr. Williams believed that they might have flown through a radioactive cloud resulting from one of the Soviet Union's nuclear bomb tests.

A month after his discovery of the redshank, Dr. Harrison found another bird shot down in southeast Sussex which had its summer plumage in mid-winter. This, too, had probably come from northern Europe.

The second bird was sent to Dr. John Loutit of the radiobiological research unit at the British Atomic Energy Authority's establishment at Harwell. He found that the bird was radioactive.

The whole case was then given to the St. Bartholomew team, who have found that they can artificially change birds' feathers by submitting them to radiation.

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MEDICINE

Public Health Service Has Polio Problems

➤ BEFORE THE SABIN oral polio vaccine is used in this country, several problems should be resolved, the National Foundation indicated in calling a special meeting of its Advisory Committee on Virus Vaccines.

The Foundation's March of Dimes program has long helped battle polio. Its funds paid for the development of the earlier Salk vaccine and now the new Sabin vaccine. The Sabin vaccine was named by the U. S. Public Health Service on Aug. 24 as the live-virus polio preventive suitable for Government license.

The Foundation committee met in New York Sept. 14 to discuss viremia—the presence of polio virus in the blood—after administration of the Sabin vaccine. Some of the strains in live vaccines have been found to cause this condition on occasion.

With viremia the likelihood of the vaccine affecting the central nervous system is greater. Dr. Thomas M. Rivers, the Foundation's vice-president for medical affairs, has indicated there is need for further evidence on the subject.

The Foundation is also sponsoring further research on the problem of reversion, or the extent to which weakened vaccine viruses regain some of their original strength after passing from vaccinated to unvaccinated persons.

The Foundation's recommendations may affect the Public Health Service's writing of rules to govern the use of the new vaccine. The vaccine was developed by Dr. Albert B. Sabin of the University of Cincinnati. Four drug companies are preparing to bring it to market by the middle of 1961.

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BACTERIOLOGY

Worms Test for Poison From "Golden Staph"

➤ WORMS CAN probably serve as laboratory animals in testing for enterotoxin, the the food poisoning material produced by *Staphylococcus aureus* organisms, University of Wisconsin studies in Madison, Wis., indicated. The worms used are called soil nematodes and are just large enough to be seen with the naked eye in strong light.

Bacteriologists Myrtha Rosas del Valle and Elizabeth McCoy said the nematode test looks extremely promising. They pointed out that nematodes can be mass produced and easily controlled in laboratory cultures. Because of this, it is possible to use more of them in testing than if more expensive animals were involved, thus increasing the accuracy of the test.

Results of the test are easily interpreted by watching the nematodes which had been eating the food to be tested. If mildly affected, they lose their snake-like motion temporarily; if severely poisoned, they die. The minimum time for producing a reaction on the nematodes is 30 minutes; readings are confirmed after one hour, and if no effect is shown after four hours, negative results are reported.

While the University of Wisconsin tests were concerned primarily with milk powder, the bacteriologists said that food poisoning cases have been traced to the *Staphylococcus aureus* enterotoxin in many foods. Man carries the bacteria in light scratches and in deeper infections such as boils.

University bacteriologists are continuing their studies, to make sure the nematode test is specific for enterotoxin, and plan to study ways of controlling the production of enterotoxin.

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MEDICINE

Mental Patients Sleep With New Pill, Hyptran

➤ MENTAL PATIENTS can get a good night's sleep with new tablets called Hyptran, which contain a combination of a barbiturate and a slow-acting tranquilizer.

Dr. Oscar Rozett, medical director of Fair Oaks Hospital in Summit, N. J., reported that the tranquilizer used is phenyltoloxamine. In studies conducted for more than a year, Dr. Rozett and his associates experimented with several tranquilizing drugs, and finally found one that worked well in combination with secobarbital, a slow-acting but safe barbiturate.

Hyptran tablets contain a small amount of secobarbital and a divided dose of the tranquilizer. Sleep is induced within an hour and anxiety is controlled by the release of the tranquilizer from an inner core two hours later.

The average duration of sleep for 112 patients who took Hyptran tablets was seven and a half hours. Nine per cent of the patients woke during the night, but second doses returned them to sleep.

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BIOLOGY

Space Biology Experiments

The discovery through space research that even a low form of life exists on other planets would have profound effect on man and his thinking, Ann Ewing reports.

➤ THE MOST PROFOUND and earth-shaking discovery resulting from space research would be that any kind of life exists on other planets.

Finding positive proof of life on Mars, not human life but plant life resembling earth's mosses and lichens, would be sensational. It would mean that life appears wherever conditions are right for it, and that life on earth is not unique.

If some form of plant life is confirmed for Mars, then chances are good that higher forms of life can be found on other planets revolving around other stars, or suns.

Many astronomers believe the seasonal color changes seen on the Martian surface are probably due to a form of Martian life, but this is now only a logical supposition. Confirmation will very likely have to wait until space research is sufficiently far advanced to include biology, as it is expected within a few years.

Present evidence for life on Mars is based on sunlight reflected from the planet as seen in the far infrared. The infrared spectrum indicates an accumulation of hydrocarbon-like materials in the dark areas.

This evidence is complemented by a report that the dark areas show the seasonal changes of granularity, indicating life forms.

Life on Mars Likeliest

In searching for life beyond the earth, Mars is usually considered the likeliest target. Microbiological analysis is believed the most promising method for detecting the presence of life and the microscope the most efficient sensing instrument.

Dr. Joshua Lederberg, professor of genetics at Stanford University Medical Center, Palo Alto, Calif., has urged microanalysis for the detection of extraterrestrial life. He pointed out, tongue in cheek, the difficulties of developing the automatic quipment that would be needed to catch a mouse or an elephant and then determine its nutritional requirements.

He believes a microscope-television combination would be a good way to obtain information from atmospheric dust or surface soil. The device would be landed on the surface of the planet, then a ribbon of transparent tape would be thrown out and, after collecting samples, rewound.

The ensuing inspection by microscope would be transmitted to earth by television. Detailed studies of such problems as how to process the samples for best obseravtion and how to focus the microscope are now under way.

Undoubtedly, the biological exploration of space will result in new insights into the origin and evolution of the physical universe, and of the chemical factors that constitute life. Even a sterile planet, one completely devoid of life, would be of extraordinary interest to scientists.

There are two dangers, however, in space exploration.

One is that man or his instruments, in landing on the moon or planets, might contaminate with microbes the very targets under study. An untouched planet with life forms presents "a rare opportunity to construct and test a theory of life that should not be dissipated," Dr. Lederberg said.

The second danger, exposure of humans to contamination by foreign organisms from other planets, is more remote in time. However, Dr. Lederberg has warned that even the slightest risk of epidemic disease, and the greater likelihood of weeds that could hurt earth's agriculture, makes the premature return of planetary samples or of craft that might inadvertently carry them impossible.

Dr. Lederberg's report to the Space Science Board of the National Academy of Sciences-National Research Council discounts the possibility of life on the moon because of the lack of atmosphere and water.

However, the moon does offer a chance to test the theory that spores may be the original space travelers. Natural or artificial transfer of spores has been proposed by some as an alternative theory to the evolutionary theory of life on the planets.

Because the moon is a gravitational trap for meteoric material, particles of earthly origin might be found there, saved from the deadly effects of solar radiation by the protection of lunar crevices.

Among others, Dr. Thomas Gold, director of the Cornell University Center for Radiophysics and Space Research in Ithaca, N. Y., has suggested that the beginning of biological evolution on a planet may result from contamination brought by space travelers. A billion years later inhabitants of such a planet might then be in a position to spread the contamination further.

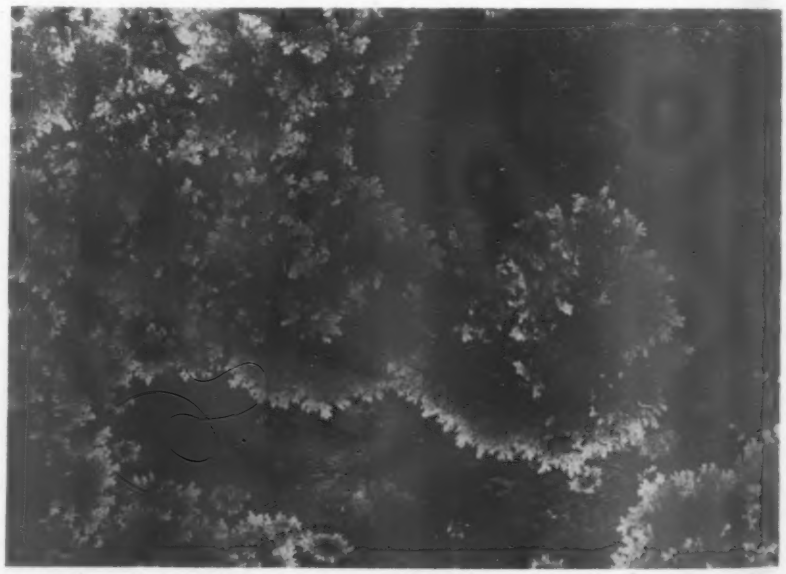
There is little doubt that another century of productive science and technology, Dr. Lederberg believes, could give humans the ability to disseminate life.

Ideas Anticipated in Fiction

Many of the ideas Dr. Lederberg presented to the Space Science Board are not new. However, only occasionally have they been reported scientifically. Some are anticipated in the classic works of science fiction, such as "War of the Worlds."

But space biological research is no more fantastic than the realization of space travel itself.

For space research to uncover facts about the cosmic distribution of life, much thoughtful insight, meticulous planning and laboratory testing will be needed. Not only international cooperation, but mutual



POSSIBLE LIFE FORMS—Lichens or mosses, such as shown in this photograph, are the types of life forms most often suggested as those, if any, that exist on Mars. Within a few years, the search for life beyond the earth will be a reality.

understanding among scientific fields as different as biochemical genetics and planetary astronomy is a must.

The argument concerning whether or not there might be life on Venus is connected with its temperature, a highly controversial subject. Dr. Lederberg believes accurate measurements of its temperature must be made as soon as possible. Even should the surface be unbearably hot, as many astronomers believe, there may be a more temperate layer at another level.

Conditions on Mercury may be somewhat like those on the moon. However, since Mercury keeps one side always turned toward the sun and the other turned away, its dark side may furnish an even more reliable refuge for space traveling spores than the moon.

Mercury, Venus, the earth and Mars, in that order, are the planets closest to the sun, and are called by astronomers minor planets. The major planets include Jupiter, which is the largest in the solar system, more massive than all other planets combined.

Main Planets Difficult to Visit

In view of their distance, exploring the main planets may be very difficult. Because of Jupiter's large mass, slowing down a space vehicle to land on the outermost planets may be very hard to manage.

However, the fact that they have a high proportion of light elements, which have been bombarded by solar radiation at temperatures and in gravitational fields very different from the earth's, offers "the most exciting prospects for novel biochemical systems," Dr. Lederberg believes.

Since useful landings on other planets are difficult and hazardous, Dr. Lederberg urges that some attention be given to experiments done at a distance. Balloon and satellite-mounted telescopes can reveal much about planetary chemistry and, therefore, biology. Space probes to the vicinity of planets can furnish additional information prior to actual landings.

Earth Would Appear Different

To turn the tables, what could possible intelligent life on other planets discover about the earth with equipment such as is now available on earth?

From Venus, for example, the earth through the telescope would appear very different from any of the other planets. The most conspicuous feature would be its clouds, which on the average cover about half the earth's surface and reflect considerably more light than the surface.

When spotted through the clouds, the most conspicuous surface features would probably be the reflection of the sun from oceans, snow-covered areas and deserts, which would be yellowish or reddish in color if there were little vegetation. The darkest parts of the earth's surface would be the oceans, when not reflecting direct sunlight, and the great forest regions. Cultivated regions and grasslands would appear somewhat green, but only the most general features could be seen. To be seen individually, objects would have to be many miles in diameter, so the chances are against detection of the existence of mankind from Venus.

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BIOCHEMISTRY

Gives Scientists Tracer

▶ BECAUSE OF THE TESTING of nuclear weapons, scientists have in their possession a giant-scale tracer that can be used to study the mechanisms and rates of many natural processes that involve the element carbon.

Several examples of such tracer studies are suggested by Drs. Wallace S. Broecker and Edwin A. Olson of Columbia University's Lamont Geological Observatory at Palisades, N. Y., in a report to Science, 132:712, 1960. They also report estimates of the proportion of radioactive carbon available for such studies.

The ratio of carbon-14 (radioactive carbon) to carbon-12 in the atmosphere over the Northern Hemisphere will reach a maximum before 1963 at from 1.3 to 1.4 times the pre-bomb level, the scientists report.

The maximum for surface ocean water will be between 1.09 and 1.15 times the pre-bomb level and the maximum will occur between 1970 and 1975.

By 1980, the ratio for the atmosphere will have dropped halfway back to the pre-bomb level.

Early in the next century, the proportion of radioactive carbon in the atmosphere will be affected more by man's burning of coal and oil than it is by setting off of nuclear bombs. This is due to the fact that such combustion releases into the atmosphere carbon dioxide that is free from radioactive

Bomb-produced radioactive carbon can be used as a tracer in investigations in the fields of soil science, biochemistry and oceanography, the scientists suggested.

Radiocarbon measurements in simultaneously collected tree-leaf and atmospheric carbon dioxide samples, for example, show that the concentrations are often the same but that situations arise where tree leaves give a lower value. A possible explanation for this lack of agreement is that the leaves receive part of their carbon dioxide through the roots of the tree.

Bomb-produced radiocarbon also has effects on radiocarbon dating. Although archaeologists have long been complaining that the bomb-produced radiocarbon has been interfering with their dating tests, the bomb-produced radiocarbon can also have its advantages, the scientists indicated.

Due to "continuous spiking" of the atmosphere with bomb-produced radiocarbon, changes in the radiocarbon concentration throughout the carbon cycle are now occurring much faster than changes due solely to radioactive decay. Consequently, processes carried out in from one year to 100 years are now measurable or will be in a few years.

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• Books of the Week •

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

AGRICULTURE AND ECOLOGY IN AFRICA: A Study of Actual and Potential Development South of the Sahara—John Phillips—*Praeger*, 424 p., map, $13.50. Technical survey of the different bioclimatic regions, discussed in terms of climate, soils, vegetation, animals, and the problems of human health and economic development.

THE ANATOMY OF PLANTS—P. Font Quer, transl. from Spanish by D. H. R. Newton—*Harper*, 128 p., illus., $2.25. Describes for the layman the characteristic structural features of plants.

CACTI—E. Shurly—*Abelard-Schuman*, 160 p., 15 full-color plates, $4.50. Practical guide to the cultivation of cactus plants.

THE CARBOHYDRATES—S. F. Dyke—*Interscience*, 232 p., illus., $4.75. Selected material covering structure, reactions and derivatives of monosaccharides, the oligosaccharides, and carbohydrate metabolism.

CONSERVATION DIRECTORY 1960—*National Wildlife Federation*, 121 p., paper, 50¢. List of organizations and officials concerned with natural resources in the U. S., Canada and Latin America.

CONTEMPORARY PERENNIALS—Roderick W. Cumming and Robert E. Lee—*Macmillan*, 363 p., illus. by A. Rosse, $6.95. About planning, planting and care of perennials, description of 560 species and check list of outstanding species.

THE DELAYED EFFECTS OF WHOLE-BODY RADIATIONS: A Symposium—Bernard B. Watson, Ed.—*Johns Hopkins Press*, 80 p., illus., $4.50. Papers discuss nuclear radiation effects on life shortening, leukemia, cataracts, and genetic alterations.

THE DESERT YEAR—Joseph Wood Krutch—*Viking*, 270 p., illus. by R. Freund, paper, $1.35. Reprint of naturalist's account of the desert world of the American Southwest.

EFFECTS OF DISSEMINATION OF RADIOACTIVE MATERIALS ON WATER RESOURCE CONSERVATION WITH SPECIAL REFERENCE TO MICHIGAN—Morris Deutsch—*Mich. State Agricultural Experiment Station*, 35 p., paper, single copies free upon request direct to publisher, Dept. of Resource Development, East Lansing, Mich.

EXPERIMENTAL PSYCHOLOGY—Burton G. Andreas—*Wiley*, 595 p., $6.95. Presents general principles, methods and techniques, and shows how specific techniques have been applied to major problem areas in behavioral research.

FACES LOOKING UP—Mina Lewiton—*Harper*, 153 p., illus. by H. Simon, $2.95. A book for children about school children in 12 different countries.

FOUR WAYS OF BEING HUMAN: An Introduction to Anthropology—Gene Lisitzky—*Viking*, 303 p., illus. by C. B. Falls, paper, $1.45. Account of the cultural patterns of four primitive societies: Semang, Eskimos, Maoris, and Hopis.

GOD SPEED THE PLOW: The Coming of Steam Cultivation to Great Britain—Clark C. Spence—*Univ. of Ill. Press*, 183 p., illus., $4.75. Fully annotated, this book is the 1959 winner of the Agricultural Historical Society Award.

GOLDFISH VARIETIES AND WATER GARDENS—William T. Innes—*Innes Pub. Co.*, 3rd ed., 385 p., illus., $6.95. Beautifully illustrated handbook on goldfish and aquatic plants.

GRASSES—Irmengarde Eberle—*Walck, H. Z.*, 56 p., illus. by E. J. Keats, $2.75. Shows young children the importance of grasses in different parts of the world.

HOW TO CAPTURE ACTION IN PHOTOGRAPHY—Dan Daniels—*Verlan Bks.*, 128 p., illus., paper, $1.95. Manual on the techniques of shooting photographs conveying action, mood and impact.

ICHNEUMON-FLIES OF AMERICA NORTH OF MEXICO: 2. SUBFAMILIES EPHIALTINAE XORIDINAE, ACAENITINAE—Henry and Marjorie Townes and others—*Smithsonian Inst.*, 676 p., illus., paper, $2.50.

INSTALLING HI-FI SYSTEMS—Jeff Markell and Jay Stanton—*Gernsback*, 224 p., illus., $5; paper, $3.20. Gives the layman technical as well as legal and structural information.

INTELLIGENCE: Its Evolution and Forms—Gaston Viaud, transl. from French by A. J. Pomerans—*Harper*, 127 p., illus., $2.25. About the variations in intelligent behavior in certain animal species, primitive peoples, and civilized man.

INTRODUCTION TO QUANTUM MECHANICS—Robert H. Dicke and James P. Wittke—*Addison-Wesley*, 369 p., $8.75. Textbook for graduate students or advanced undergraduates, introduces physical concepts and mathematical formulations of nonrelativistic theory.

IRIS FOR EVERY GARDEN—Sydney B. Mitchell—*Barrows*, rev. ed., 216 p., illus., $4.95. Practical guide for the amateur as well as the specialist.

LIFE: Its Dimensions and Its Bounds—Robert M. MacIver—*Harper*, 144 p., $3. In dialogue form author lets scientists explore the questions raised by new discoveries in the region separating live and lifeless matter.

MATHEMATICAL SNAPSHOTS—H. Steinhaus—*Oxford Univ. Press*, rev. ed., 328 p., 366 illus., $6.75. Makes mathematical phenomena visual through photographs and diagrams, from simple tricks to advanced problems.

MATTER AND ANTIMATTER—Maurice Duquesne, transl. from French by A. J. Pomerans—*Harper*, 127 p., illus., $2.25. Account of the discovery of antimatter with a discussion of its implications and possibiilties.

METHODS IN GEOCHEMISTRY—A. A. Smales and L. R. Wager, Eds.—*Interscience*, 464 p., illus., $13.50. For the advanced student and the research worker, book presents problems dealing with the analytical determination of the elements of the Periodic Table.

THE NEXT FIFTY YEARS OF FLIGHT—As visualized by Bernt Balchen, told to Erik Bergaust, foreword by Lt. Gen. James H. Doolittle—*Viking*, 214 p., illus., paper, $1.25. Reprint of 1954 edition.

ON THE VARIOUS FORCES OF NATURE AND THEIR RELATION TO EACH OTHER—Michael Faraday; William Crookes, Ed., introd. by Keith Gordon Irwin—*Viking*, 106 p., illus., 95¢. Christmas Lecture delivered before a juvenile audience at the Royal Institution in 1859.

THE STORY OF ATOMIC THEORY AND ATOMIC ENERGY (Formerly Titled: The Atom Story)—J. G. Feinberg, foreword by Frederick Soddy—*Dover*, 264 p., illus. by Lewis, paper, $1.45. Brought up to date, with new Postscript and Prospect by author.

THE STORY OF YOUR BLOOD—Edith Lucie Weart—*Coward-McCann*, 64 p., illus. by Z. Onyshkewych, $3. Tells young readers about the vital role blood plays in our bodies.

TACTICS OF SCIENTIFIC RESEARCH: Evaluating Experimental Data in Psychology—Murray Sidman—*Basic Bks.*, 528 p., $7.50. For the student of scientific methodology as well as the experimental psychologist.

TEA—Trevor Jones—*Educ. Supply Assn. (Taplinger)*, 90 p., illus., $2.50. Simple account of the history and processing of tea.

THERMOELECTRICITY—Paul H. Egli, Ed.—*Wiley*, 407 p., illus., $10. Fundamental concepts in thermoelectricity, physics of properties determining thermoelectric performance, high temperature problems and methods of measuring thermal conductivity.

WALT DISNEY'S THE ODYSSEY OF AN OTTER: A Fact-Fiction Nature Story—Rutherford Montgomery—*Golden Press*, 124 p., illus. by H. Greene, $2.50. For young readers.

WOOL—P. A. Wells—*Educ. Supply Assn. (Taplinger)*, 5th ed., 122 p., illus., $2.50. Describes for young readers production and fabrication of wool.

THE WORLD OF NIGHT—Lorus J. and Margery J. Milne—*Viking*, 248 p., illus. by T. M. Shortt, paper, $1.35. Tells about the night behavior of insects, fishes, reptiles and mammals in their native habitats.

• Science News Letter, 78:220 October 1, 1960

MEDICINE

Migraine May Cause Death

▶ MIGRAINE may cause death under certain conditions. Dr. Erik Ask-Upmark, Royal University of Uppsala, Sweden, lists four conditions under which death may result.

1. Ophthalmoplegic migraine (affecting the eyes) may be due to an aneurysm of an artery that may rupture and be fatal.

2. Paroxysmal tachycardia (rapid heart action coming on and stopping) may be equivalent to migraine. It is apt to occur in families with migraine, so that an individual may have migraine at one time and the heart condition at another. Most cases of paroxysmal tachycardia can be handled, but if no adequate assistance is given during a severe attack, the circulation may be blocked as in pulmonary embolism.

3. There are rare instances of migraine connected with bradycardia (slow heart), and if in such a case ergotamine tartrate is injected into the veins, the heart may stop. Quick treatment with adrenaline may counteract the symptoms.

4. An increasingly common complication is in the kidneys, and can cause death by uremia (a toxic condition in which urine is in the blood).

Dr. Ask-Upmark says the kidney complication may be caused by long dosage with phenacetin or by ergotamine tartrate for the relief of migraine headaches.

A fatal case was that of a 56-year-old physician, who because of migraine since childhood had been taking remedies containing mainly phenacetin. He died of uremia.

Seven others who escaped death but had advanced uremia were among those who had taken phenacetin. In addition, one woman had been taught by her physician to give herself injections of ergotamine tartrate.

Migraine may occur in from three to 30% of the population, Dr. Ask-Upmark reports in the British Medical Journal, Sept. 17, 1960, but usually is not prolonged or dangerous in a large percentage. It occurs more commonly in women than in men, so that if both sexes are considered, and "only severe cases embittering life for a number of years are included," three percent may be more accurate.

Animal experiments have failed to show proof that kidney trouble is caused by phenacetin. The doctor concludes that small doses of phenacetin used occasionally seem to be fairly safe, but that large doses taken over a number of years may bring about a form of nephritis that can cause death.

• Science News Letter, 78:221 October 1, 1960

CHEMISTRY

Fallout Measurements By Chemistry Reported

➤ STRONTIUM-90 can be measured more accurately now by means of a new chemical extraction method described by chemists of the Argonne National Laboratory, Argonne, Ill., attending the meeting of the American Chemical Society in New York.

Strontium-90, produced in nuclear explosions, is one of the most dangerous elements in fallout. It is a known cause of leukemia and bone-cancer and is often referred to as the "bone-seeker" because, like calcium, it tends to seek the bone in man and animals.

The new process developed at Argonne makes it possible to separate strontium and calcium, thereby improving the accuracy in assaying strontium-90 content in soil and elsewhere.

It may contribute to precise measurements of world-wide strontium-90 distribution. G. W. Mason, D. F. Peppard and Sonia McCarty, of Argonne's Chemical Division, developed the new method under research sponsored by the Atomic Energy Commission.

• Science News Letter, 78:222 October 1, 1960

Do You Know

A six-ounce *sweet potato* contains more than twice the amount of vitamin A needed daily by the human body, and the value increases during curing and storage.

In the United States there are about 925 *radio* receivers per 1,000 of the population.

Hansen's disease, better known as *leprosy*, is the least communicable of all communicable diseases.

The Ghibli is a blistering-hot south *wind* blowing from the Sahara, at 35 miles an hour, into Tripoli, where 135-degree Fahrenheit temperatures occur in summer.

The United Kingdom leads the world in *newspaper* circulation with an estimated 573 per 1,000 inhabitants, followed by Sweden with 462 per 1,000.

Questions

GENETICS—How many chromosomes are found in each normal person? p. 212.

LINGUISTICS—How many words per hour can the mechanical dictionary RUSDIC help translate? p. 213.

MEDICINE—What is one of the most dangerous causes of burn accidents? p. 211.

Photographs: Cover, Cranbrook Institute of Science; pp. 211, 218, Fremont Davis; p. 213, Massachusetts Institute of Technology, Lincoln Laboratory; p. 215, Matthew W. Stirling, Jr.; p. 224, Isis, Inc.

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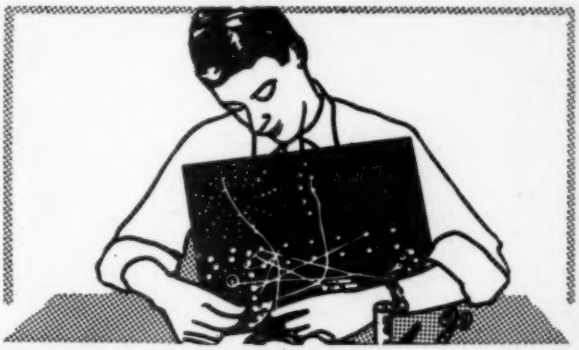

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- "How to Go from Brainiacs to Automatic Computers" by Edmund C. Berkeley.
- List of references to computer literature including "Minds and Machines" by W. Sluckin, published by Penguin Books (Baltimore), 1954, 233 pages, and other references.

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New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1059. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

RAIN CHECKS serve as invitations for folks who say they can not get over for golf on Tuesday but "can I have a rain check." The rain checks come in a thin check book. Stubs remind the user of appointments he has made.

• Science News Letter, 78:224 October 1, 1960

HOME PILOT STUDY, a series of four long-playing record albums, teaches flying fundamentals. They are designed for persons who want pre-flight background before taking flying lessons or for students who want to supplement their regular instruction.

• Science News Letter, 78:224 October 1, 1960

AUTOMATIC BIRD SCARER, a small portable device made in the Netherlands, uses acetylene gas fed into a combustion chamber behind a horn-shaped barrel. The flowing gas drives a piston that cocks a firing mechanism and thus creates small, but loud and regular explosions.

• Science News Letter, 78:224 October 1, 1960

HYDRAULIC DRAFTING TABLE, shown in the photograph, rises and turns like a barber's chair. Thus the table may be adjusted to changing angles or, if classified material is being worked on, may be

quickly turned away from a visitor's gaze. Unused boards can be turned aside to provide more work space in crowded offices.

• Science News Letter, 78:224 October 1, 1960

DOG SLED, for children and the family dog, seats two children with a third standing as driver. Made of Maine ash, the sled is 53 inches long, has a filled pad of cloth backed plastic. It can be used either with the dog pulling it or as a snow sled.

• Science News Letter, 78:224 October 1, 1960

EASTERN LEGEND GAME is adapted from an ancient legend of Mandalay. The legend says that wise men sit, eternally transferring a tower of ivory disks from one ruby needle to two others. The object of this small, plastic version: rebuild the tower of disks without ever placing a larger disk on a smaller one.

• Science News Letter, 78:224 October 1, 1960

LEATHER CLEANER, a specially treated tissue, removes spots and thus cuts down on leather cleaning bills. Each tissue comes in a small foil package and may be used several times.

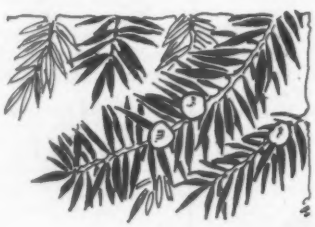
• Science News Letter, 78:224 October 1, 1960

BUMBLE BEE PULL TOY features an angry toy bee that buzzes as it flies about a shatter-proof transparent dome. On the base of the toy, there is a funny face with great eyes that anxiously follow the bee's movements. Designed for pre-schoolers, the plastic toy is pulled by its 28-inch nobbed string.

• Science News Letter, 78:224 October 1, 1960

Nature Ramblings

Patterns in the Green World



➤ BEFORE EUROPEANS came to this New World with their axes and plows, most of the eastern United States was a vast forest of hardwood trees. These great virgin stands of timber represented the so-called "climax" growth for this region of the world. Farther north and along the mountainous backbone of the East were forests of conifers; these were "climax" forests for the cold country. Even farther north, beyond the timber line, matted shrubs and grasses formed the tundra climax.

When the pioneers went westward, they found the great grasslands, the climax of the midland of the nation; and in the Southwest they discovered the arid cactus and sagebrush climax of the desert. In the far west were replicas of vegetation types they had met elsewhere, the types varying with the temperatures and aridity of the hills and valleys.

Climax vegetations are the plants which come to dominate a region when it is left to nature. The type of climax depends on the soils and climate of a region, especially the amount of moisture and temperature. For example, the moisture of the eastern states along with the generally warm climate leads to the hardwood forest climax.

Moist but cold weather in the north and in the mountains, results in an evergreen conifer climax. Proceeding westward across the nation, the climate becomes increasingly dry, so that the hardwoods give way to grasslands and these in turn to deserts.

Each region on the face of the earth has a climax vegetation typical of its soils and climate. But the term "climax" implies what happens when nature is left alone. Man's axes destroyed the great virgin stands of the East and his plows the grasslands of the Midwest. Even large stretches of desert vegetation have been altered by cattle grazing, farming and the introduction of new plants.

But nature is patient; and every time a change is made in the land, a slow but steady succession of new plants tends to restore the old balance. If man were to be eliminated from the earth, it would only be a matter of time before each region had its appropriate climax vegetation restored. This "plant succession," leading from an unnatural or non-typical vegetation toward the climax type, usually follows a regular pattern.

Anyone can figure out the probable recent history of a piece of land if he knows something of plant succession. For example, when a cultivated field is abandoned in the southern states, typically it is filled with annual plants the following year. After about two years, perennial plants come in, and these persist until young pines, sumacs, persimmons and the like take over. Soon the pines dominate. After several years, hardwoods begin to grow in the shadow of the big pines, and the pines then give way to a complete hardwood forest—the climax forest.

—HORACE LOFTIN

• Science News Letter, 78:224 October 1, 1960